Amendments to the Specification

Please add the following new heading before paragraph [0001]:
BACKGROUND

Please replace paragraph [0002] with the following amended paragraph:

[0002] A method ~~according to the precharacterizing clause of claim 1~~ for automatically controlling a production process for the series production of order-specific products is known from DE 19927563 A1. A separation of the sequence of the production objects and the sequence of the orders is disclosed. A production object, referred to there as a product, is temporarily assigned an order for a partial process, referred to there as a production step. In this way, a production object and an order are selected. A work order for the partial process to process the selected production object is generated for the selected order and is executed when the production object runs through the partial process. Once the production object has run through the partial process, it is assigned the same order or another order.

Please add the following new heading before paragraph [0005]:
SUMMARY OF THE INVENTION

Please replace paragraph [0005] with the following amended paragraph:

[0005] The invention is based on the object of providing a method ~~according to the precharacterizing clause of claim 1~~ for automatically controlling a production process for the series production of order-specific products where the production process comprises a partial process, a sequence of orders in electronic form for products which are produced in the production process, and a sequence of production objects from which the products are created run through the production process, a selection process in which an order of the order sequence and a production object of the production object sequence that match one another are selected, the selected production object is processed according to the selected order in the partial process and the selection process and processing are repeated until each order of the order sequence has run through the partial process, by which it is ensured in series production that the processing of an order in the partial process is begun at the latest after a maximum waiting time.

Please delete paragraph [0006].

Please replace paragraph [0029] with the following amended paragraph:

[0029] In a further refinement ~~as claimed in claim 2~~, a numerical limit <u>may be</u> ~~is~~ prescribed. It is consequently prescribed how many orders at most there may be simultaneously in the electronic buffer memory. The refinement ensures that this prescribed numerical limit is maintained.

Please replace paragraph [0036] with the following amended paragraph:

[0036] ~~The refinement as claimed in claim 4~~ <u>A further refinement</u> designates an alternative method, to select one order from among the orders stored in the buffer memory. For this purpose, it is automatically tested how long the processing of each order in the partial process lasts, presupposing that this order and a matching production object are selected. In this case, a matching production object is determined on a trial basis for each order in the buffer memory. On a trial basis, a work order for the partial process is generated for the processing of the matching production object for the order. It is determined how long the implementation of this work order will last with respect to the matching production object. For this determination, a simulation is carried out for example, or operating protocols with execution times of jobs performed in the partial process are evaluated. That order in the buffer memory for which the sum of the waiting time in the buffer memory and the implementation time determined on a trial basis takes the greatest value is selected. This ensures that the run-through time through the partial process is as small as possible on average over the deferred orders.

Please replace paragraph [0037] with the following amended paragraph:

[0037] ~~The refinement as claimed in claim 5~~ <u>Another further refinement</u> takes into account the possibility that an order remains in the electronic buffer memory until the waiting time limit is reached. In this case, this order is removed from the buffer memory and marked. For example, it is identified as not able to be constructed within a prescribed time period or is transferred to the beginning of the production process or the partial process.

Please replace paragraph [0038] with the following amended paragraph:

[0038] The invention provides that an order in the buffer memory and a matching production

object are selected whenever the waiting time of an order in the buffer memory is greater than or equal to the waiting time limit. ~~Claim 6~~ <u>Another further refinement</u> provides that, under certain circumstances, an order in the buffer memory is selected even if no waiting time of an order reaches this limit, to be specific whenever the first production object of the production object sequence matches an order in the buffer memory.

Please replace paragraph [0039] with the following amended paragraph:

[0039] In ~~the refinement as claimed in claim 7~~ <u>yet a further refinement</u>, the occasional requirement that production objects are processed in the partial process in batches is taken into account. For example, the batch size is $N = 4$, and, in a paint line as the partial process, four production objects are painted in the same color one after the other as a batch. In this way, the paint line can be operated much more efficiently than if, each time after painting a production object, the paint line had to be cleaned and prepared for painting in a different color. In this example, the painting of the production objects does not depend on such features of the production objects that are manufactured in previous partial processes.

Please replace paragraph [0040] with the following amended paragraph:

[0040] In ~~a development of this refinement (claim 8)~~ <u>another refinement</u>, an optimum set, with respect to an assessment function, of N orders and N production objects is selected. For this, various possible selections, that is to say various sets, are compared, in that they are selected on a trial basis, the assessment function is applied to each of these sets and the set assessed as the best is actually selected. At least one of the following individual criteria is included in the assessment function:

– How many further production objects of the production object sequence are before a production object of the set selected on a trial basis and themselves do not belong to the set? In order that the selected N production objects are brought forward to the first N places in the case of an actual selection, these further production objects must be buffer-stored, for example in a sorting buffer, or selected production objects must be brought past the other production objects. The fewer further production objects are determined, the higher the respective set is assessed. With regard to this individual criterion, the first N production objects of the production object sequence are optimal - but it is possible that N orders matching them are given a low individual assessment.

– How many further orders of the copy of the order sequence are before an order of the set selected on a trial basis and themselves do not belong to the set? In order that, in the case of an actual selection, the selected orders can be executed, these further orders must be accepted in the electronic buffer memory.

– How long, i.e. how many cycles, have the orders of the set already been in the electronic buffer memory? Orders of the set that are currently not in the buffer memory but in the order sequence are preferably given a waiting time of 0 cycles in this assessment.

– What costs and what time expenditure are caused by the processing of the N production objects in the partial process according to the N orders? Taken into account here in particular are rechucking or resetting times, for example resetting times on a paint line, to allow production objects to be painted in a different color.

Please replace paragraph [0041] with the following amended paragraph:

[0041] Preferably, in particular in the case of cyclical production, the additional position range of the partial process is determined (claim 10). The position range is made up of the maximum promotion and the maximum demotion. The promotion of a production object is the number of cycles that the production object leaves the partial process earlier than planned. Correspondingly, the demotion of a production object is the number of cycles that the production object leaves the partial process later than planned. Promotions and demotions can be determined in a simple way by comparison of the order sequence with the generated copy of the order sequence. If an order in the copy leads the corresponding order in the original sequence by N cycles, the production object selected for this order in the copy also leads the order in the original sequence by N cycles.

Please replace paragraph [0042] with the following amended paragraph:

[0042] Furthermore, the position quality in the partial process is preferably determined (claim 11). The position quality is preferably calculated as the proportion of all the orders in the order sequence made up by those orders that were not deferred before feeding to the partial process. In order to determine the position quality, it is determined which orders of the copy end up in the electronic buffer memory and which do not. If, for example, the position quality is lower than a

prescribed lower limit, measures are taken to increase the position quality. For example, additional places are provided in a sorting buffer for production objects, in order that more production objects can be buffer-stored and therefore a matching production object can be brought forward to the first place of the production object sequence more frequently for the first order of the copy of the order sequence by production objects being stored in the sorting buffer.

Please replace paragraph [0043] with the following amended paragraph:

[0043] A production process, for example for motor vehicles, comprises a number of partial processes, before which selection processes ~~according to the precharacterizing clause of claim 1~~ are carried out. A refinement provides that, for each of these partial processes, an own copy of the order sequence is generated, used exclusively for selection processes of this one partial process. According to ~~the refinement as claimed in claim 12, on the other hand~~ another refinement on the other hand, a copy is used for two partial processes, to be specific the partial process of the method as the first partial process and a further subsequent partial process as the second partial process. The first partial process is, for example, the shell construction of a production process for motor vehicles, the second the painting. The sequence of the orders in the copy is changed according to the sequence in which the orders are selected before entering the partial process. Here, the respectively selected order is inserted into the copy at the first place. The copy is used again for selection processes for the second partial process. The selection processes for the second partial process are carried out in the same way as for the first partial process. It is possible to prescribe a different waiting time limit for the first partial process than for the second partial process.

Please replace paragraph [0045] with the following amended paragraph:

[0045] ~~The refinement as claimed in claim 13~~ Another still further refinement provides that the production objects run one after the other through two partial processes. In order to select orders and production objects for the temporally first of these partial processes, a copy of the order sequence is generated, and orders are selected from this copy. The selection processes for the second partial process, on the other hand, are carried out with the (original) order sequence. In particular in the example just described, order-specific subsystems are manufactured, so that, in the partial process of the "activity of providing interior fittings" as the second partial process, an

order usually only matches a single production object and/or a set of order-specific subsystems. A copy therefore need not be created.

Please replace paragraph [0046] with the following amended paragraph:

[0046] ~~The refinement as claimed in claim 14~~ Another refinement demonstrates a further value to determine automatically a code number of the partial process, to be specific the sequence quality. Preferably, whenever the sequence quality is greater than a prescribed upper limit or less than a prescribed lower limit, measures are taken. ~~According to claim 15~~ In another refinement, the sequence quality is, for example

– the greatest value of all the relative positions,

– the smallest value of all the relative positions

– and/or the mean value of all the relative positions.

Please replace paragraph [0047] with the following amended paragraph:

[0047] ~~In claim 16, a refinement of the~~ In another refinement a test as to whether or not an order and a production object match one another is designated. Each order comprises features of the product to be produced order-specifically. Each production object comprises features that are produced in the partial process. In the case of motor vehicles, examples of these features are, for example, the designations of right-hand drive/left-hand drive or sedan/coupe or the presence or absence of possible special items of equipment. In the check whether a production object and an order match one another, the production object features are compared with a subset of the product features. Preferably, this subset exclusively comprises product features that are already produced in the partial process - only these need be used for a test. Features that are only produced in later partial processes are not taken into account in tests for the partial process. If, for example, a selection is to be carried out for the partial process of "shell construction", features that relate to the color or the interior equipment of a motor vehicle to be produced generally need not be included in the test.

Please replace paragraph [0048] with the following amended paragraph:

[0048] ~~According to claim 20~~ In another embodiment, the bringing forward of the selected production object to the first place of the production object sequence is carried out with the aid of a sorting buffer. This embodiment is ~~of advantage in particular~~ advantageous whenever the configuration of the production process and/or the premises available in a production facility do not allow a production object of the sequence to go ahead of a prior production object. If the sorting buffer does not offer sufficient free places for bringing the selected production object forward, the selection of production object and order is reversed. For this order, it is not possible to rule out the possibility of the waiting time exceeding the prescribed limit.

Please add the following new heading before paragraph [0049]:
BRIEF DESCRIPTION OF THE DRAWINGS

Please add the following new heading before paragraph [0056]:
DETAILED DESCRIPTION

Please amend the heading on top of page 35 with the following amended heading:
~~Patent claims~~ WHAT IS CLAIMED IS: